



LOW POWER MINIATURE MEMORY QUALIFIED FOR AERO SPACE APPLICATIONS

DESCRIPTION

The Miniature Memory, Model MSA-1A-INT Buffer Storage is a miniature, sequential access, coincident current core memory with internal addressing. It is small, light, compact, rugged and meets all necessary environmental and shock specifications for Aero Space Applications. Magnetic Core Circuits are used for all control, addressing, writing and reading functions, thus keeping the semiconductor count low and reliability high. All circuit components and memory cores are completely encapsulated in special epoxy compounds. Data input and output is asynchronous and can proceed at any rate up to rated maximums. This series is characterized by extremely low power consumption and data retention without power (non-volatile store), even in the maximum capacity memory. Standard in this series are 12 different word capacities ranging from 210 to 10,296 words, with one to eight bits per word. Other combinations are available with minor design and production changes.

ADVANTAGES

There are four major advantages to DI/AN's Miniature Memories, these are: high reliability, small size, wide operating temperature range and low power consumption. DI/AN CONTROLS has been designing and producing coincident current devices and memory units over wide temperature operating ranges since 1956 and this particular series since 1961. These units have qualified in rigorous military environmental testing for Rocket and Space Flight Programs. The smallest unit, capable of storing 210 one-bit words, is 2" x 2" x 3" for a volume of 12 cubic inches. The largest memory which is capable of storing 10,296 characters, is 9" x 8" x 4½" for a volume of 324 cubic inches. Weight of the miniature memory depends on storage capacity of the Unit.

FEATURES

- Low Power — Sequential addressing and driving by internal magnetic core logic counters.
- Flexible — Choice of one or two operating modes.
- Reliable — Proven by 10⁶ module-hours of operation.
- Rugged.
- Small.
- Lightweight.
- Widest operating temperature range.
- Manufactured in accordance with MIL-Q-9858.

ORGANIZATION

The MSA Series Miniature Memory progresses one address at a time in sequential order from the first through the last address and then back to the first again. The memory may also be divided into 2 or 3 sections each with its own first and last address. Information may be written in or read out of any section of the memory starting with the first address of that section and continuing through the last address of that section. The memory may then automatically return to the first address of the same section, stop at the last address of the section, proceed to the first address of the following section or return to the first address of the complete memory.

OPERATING MODES

Miniature Memory Storage Units are available in a choice of operating modes. The standard series provides a single Read/Write mode of operation. The special series provides two modes of operation, Clear/Write and Read/Restore, which may be selected by electrical command.

Standard

The standard series reads out each address destructively and immediately writes new data present at the data inputs into the same address. If it is desired to restore the old data, the output must be returned externally to the data inputs for rewriting into the same address. This series can use a fixed time memory cycle with a single clock pulse, or a split cycle. In the split cycle separate clock pulses are required for Read and Write commands.

Special

The special series provides Clear/Write and Read/Restore modes of operation using internal gating circuits. In the Clear/Write mode, information is updated at each address as in the standard unit. The Read/Restore mode (non-destructive data readout) can be selected by an external signal. The two modes can be interlaced in any sequence, even at successive addresses.

OPTIONAL FEATURES

1. Serial to Parallel and Parallel to Serial conversion on either input or output using Magnetic Shift Registers.
2. Marker pulse at any special address.

SPECIFICATIONS

Environment

Ambient Temperature (Please specify)	— choice of — -30°C to +75°C -55°C to +100°C
Storage Temperature	-60°C to +130°C
Relative Humidity	100%
Altitude	Unlimited

Meets Conditions Of:

1. MIL-E-8189B — Electronic Equipment, Guided Missiles.
2. Qualified for R.F.I. under MIL-1-26600.
3. Manufactured under MIL-Q-9858 and DI/AN Special Q.A. provisions.

Memory Capacities and Speed

Memories in this series are available with the following word storage capacities: 210, 420, 840, 1260, 1680, 2520, 3080, 3960, 5544, 6552, 8008 and 10,296 characters with up to 8 bits per character. The memories are asynchronous and capable of random character rates up to 10KC. Speeds up to 50,000 words/sec are available using standard techniques.

Electrical Characteristics

The power information listed below is for all storage capacities.

Power Supply Voltage	24 or 28 volts $\pm 5\%$
Power Consumption	
at 1KC word rate	Less than 100 mw for 1-bit/word. Add 50 mw for each additional bit per word of the memory word size.
at 10 KC word rate	Less than 1 watt for 1-bit/word. Add 500 mw per additional bit per word for the memory word size.

The standby current, depending on the memory size, ranges from 1 mw to 5 mw.

DELIVERY

One of the additional advantages of Di/An Magnetic Logic modules is their adaptability to perform all logic functions. As such they are easily and quickly assembled into finished equipment. Delivery of the memory is 1½ to 3 months depending on the storage capacity and non-standard features.